

## QUALIFICATIONS

Accomplished, bilingual **Engineer** with more than five years of **professional experience** in **control, automation and power electronics**. Background includes developing **embedded real-time control algorithms, power electronic circuits, and user interface** for high performance **Electric Drives**. Current research interests involve the application of novel **DSP** techniques to a variety of **power quality** problems, design of efficient algorithms for modern **PQ monitoring** system, and **electromagnetic transient modeling and simulation** of **energy systems**.

## PROFESSIONAL EXPERIENCE

**Samsung Electronics, Suwon City, Korea**

**2/98~6/03**

**R&D Engineer, Institute of Intelligent Systems, Mechatronics Center**

- Implemented speed sensorless vector control algorithm for high-performance AC Drives (5.5kW ~110kW, 2/400V, **pilot research**) with a 32-bit **DSP** (TI, TMS 320 VC33) and ASIC: conducted feasibility study by performing numerous MATLAB/SIMULINK modeling and simulation
- Tested and evaluated power electronic circuits of Smart Motor Controllers (Soft Starter) teamed with **Allen Bradley** engineers of **Rockwell Automation**
- Functioned as key member in expanding the AC Drive market (e.g. treadmill and knitting machine industries) by quickly responding to customers' needs: provided various serial communication protocols, improved automatic torque boost, control performance for a single phase input power, added process control, and ride-through capability
- Reduced a current sensor in AC Drives by designing an efficient signal processing algorithm, which led to a cost saving of \$100,000 (estimated) per year
- Developed control algorithms and designed user interface for general-purpose AC Drives (0.4kW ~ 3.7kW, 2/400V) using a **fixed-point** 32-bit RISC microcontroller (SH2) and **integrated power modules**
- Developed a real-time monitoring program that interfaced PC with electric drives using MS Visual Basic
- Integrated electric drives and host controllers into a whole control system with various interface methods
- Performed R&D based on **Six Sigma** and using **SAP R/3** and **Aspect Explore**

## ACADEMIC POSITIONS

**Graduate Research Assistant, The University of Texas at Austin, Projects with EPRI solutions**

- Design an automated waveform analysis tool extracting unique features of lightning using wavelet transform and identifying an initiating event (**Fall '06**)
- Designed practical methodology for 1) estimating parallel resonant frequency profiles based on Fourier analysis, 2) quantifying system damping based on the Hilbert transform, Prony analysis, wavelet transform, and system order reduction theory, and 3) finding the relative and exact locations of switched capacitor banks in utility feeders based on fundamental mathematical analysis of capacitor energizing: built extensive electromagnetic transient simulation models using PSCAD/EMTDC, and implemented control and signal processing algorithms using MATLAB (**Fall '04**)
- Designed functional specifications for an automated evaluation system for capacitor switching transient concerns in order to enhance the value of conventional power quality monitoring systems (**Fall '03**)

**Teaching Assistant, Electrical and Computer Engineering, The University of Texas at Austin**

- Senior Design Lab. (**Summer '06, Spring '06, Fall '05, Summer '05, Spring '05, and Spring '04**): led 10 to 14 students to the successful completion of projects on power, robotics, control, and DSP applications
- Power Electronics (**Summer '04**): assisted students to build various power converters successfully

**Research Assistant, ERC-ACI (Advanced Control and Instrumentation), Seoul National U.**

- Conducted research on the operation and control of **Flexible Manufacturing System** using stochastic processes, discrete event system modeling techniques, and genetic algorithms (**Spring '96 ~ Fall '97**)

EDUCATION & HONORS

**The University of Texas at Austin**

**May '07**

**Ph. D candidate in Electrical Engineering**, Advisor: Prof. Surya Santoso

- **Areas of Concentration:** Application of time-frequency analysis (wavelets), estimation and detection, and system identification techniques to a variety of power quality problems, time-domain electromagnetic transient modeling and simulation for power system harmonic analysis and wind energy system control and operation study, high power electronics and FACTS, optimization problems

**Yonsei University, Seoul, Korea**

**Feb '98**

**Master of Science in Electrical Engineering**, Advisor: Prof. Kwang B. Woo

- **Areas of Concentration:** Real-time computing (fault-tolerance techniques, performance measures, system modeling and OS), intelligent control with GA and NN, Flexible Manufacturing System operation

**Yonsei University, Seoul, Korea**

**Feb '96**

**Bachelor of Science in Electrical Engineering**, Advisor: Prof. Jin Bae Park

- Secured 1<sup>st</sup> rank at the graduate entrance exam among the entries of EE, Yonsei U. in 1992

**Relevant Coursework**

- Automatic and Digital Control, Power System Engineering, Wind Energy System, Electrical Transients, Power System Harmonics, Real-Time Computer System, Optimization in Engineering Problems, Digital Time Series Analysis, DSP, Robotics, Stochastic Processes, Statistical and Neural Pattern Recognition, Optimal Filtering, AI, Computer Network, Statistical Methods and Quality Assurance, Electric Machinery

**Honors**

- Graduate Study Abroad Scholarship, Korea Science and Engineering Foundation, Fall '03 ~ Spring '05
- Samsung Scholarship, Samsung Electronics Co., Ltd., Spring '96 ~ Fall '97

SKILLS

- High Level Languages: C/C++/BASIC/JAVA/PASCAL,
- Assembly Languages: Hitachi SH2/ TI DSP/ Motorola 6812/Intel 8051/80x86 Assembly
- Algorithm Development and Simulation Tools: MATLAB/Simulink, PSCAD, OrCad, LabView

PUBLICATIONS AND PATENTS (**available at [www.ece.utexas.edu/~hur](http://www.ece.utexas.edu/~hur)**)

- 5 Journal and 9 Conference Papers on Power Quality, Power Electronics and MFG System Operation
- 6 Patents(three international patents including one U.S. patent) on design techniques for AC Drives

REFERENCES

**Dr. Surya Santoso, Assistant Professor**

Electrical and Computer Engineering

The University of Texas at Austin, Austin, TX 78712

ssantoso@ece.utexas.edu

(512)-471-3371

**Dr. Mack W. Grady, Professor**

Electrical and Computer Engineering

The University of Texas at Austin, Austin, TX 78712

grady@ece.utexas.edu

(512)-471-5231

**Dr. Baxter F. Womack, Professor**

Electrical and Computer Engineering

The University of Texas at Austin, Austin, TX 78712

womack@ece.utexas.edu

(512)-471-3732